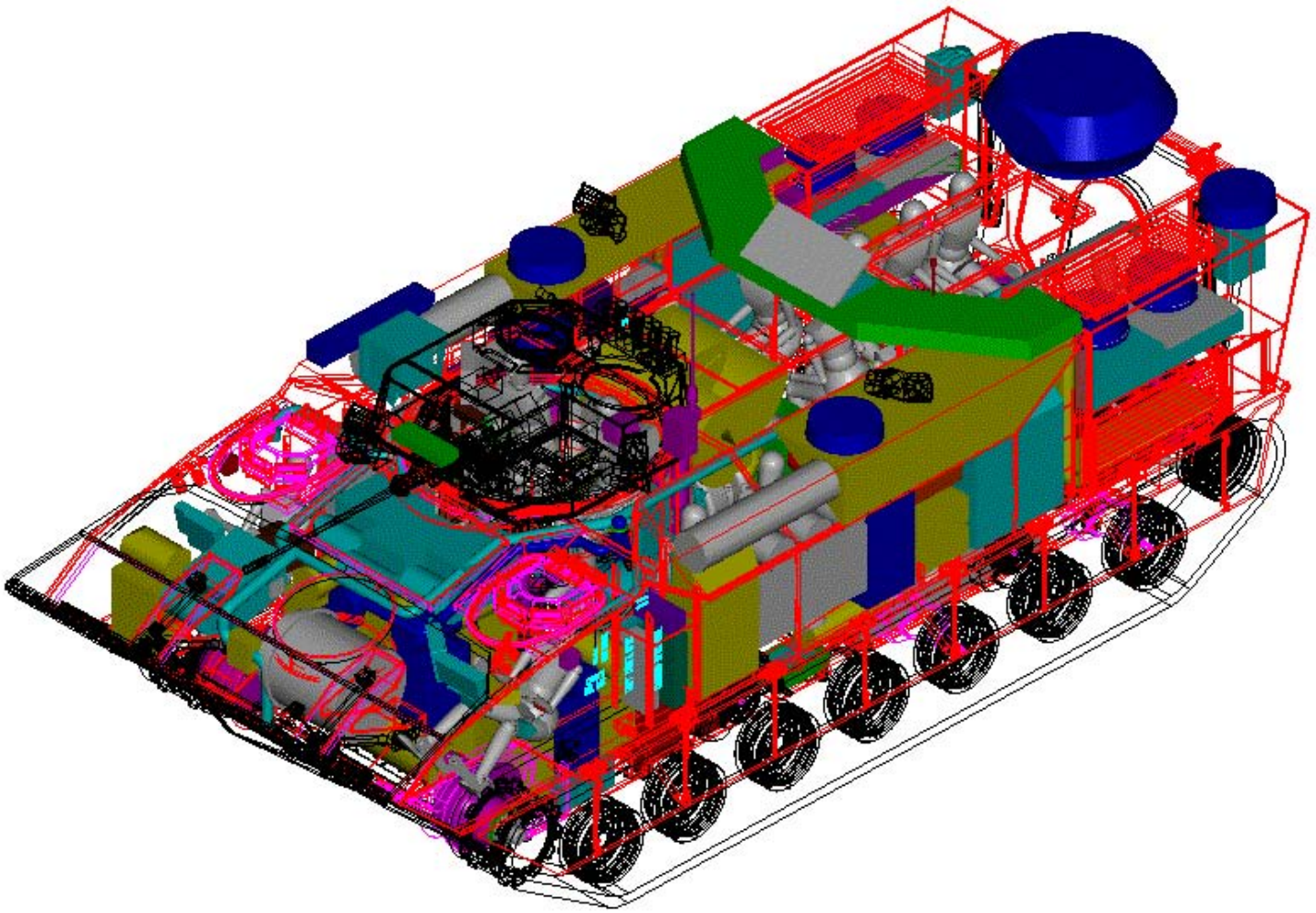
Israel Sa’ar V Class Fast
Missile Corvette

Halter “Ambassador Mk III”
Class of Fast Missile Craft




UNIT-27

A JOINT ARMY-NAVY CONCEPT EXPLORATION EFFORT TO INTEGRATE ARMY SMOKE/OBSCURANTS ONTO NAVAL BOATS

U.S. “Mk V” (SOC)
Special Operations Craft

Unique Navy Needs

Features: Unique to Naval Applications

- **Mission**
  - May not be impaired
- **Environmental conditions**
  - Shock
  - EMI/EMC
- **Power Density and Duty cycle**
  - Extended operation at part load
  - Accels./decels
  - Space and weight constraints.
- **Logistics**
  - Fuel (F-76 cap of 1% S and average of 0.59% [5,900 ppm] and JP-5 cap of 0.4% S and average of 0.047% [470 ppm])
  - Lube oil and other fluids

DoD Emission Reduction Drivers

- **Clean Air Act Amendment (CAAA), 42 U.S.C. 7401**
- **National Environmental Policy Act (NEPA) for all major Federal actions.**
- **CAA conformity for Federal actions in non-attainment and maintenance areas.**
- **EPA/State/Local Regulations**
  - **CARB Risk Reduction Plan**
- **Federal Executive Order 13123**
- **Exemptions for Tactical Equipment**

Why Is Tactical (Combatant) Equipment Exempted from Emission Regulations?

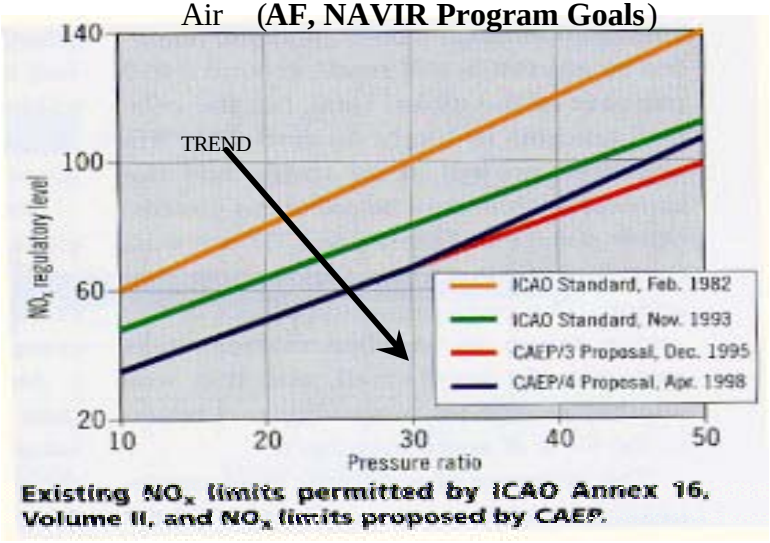
- **Tactical equipment must be capable of:**
  - **Operating in a wide variety of environments.**
  - **Operating with limited logistical and maintenance support.**
  - **Operating on a wide range of fuels including JP-5 (aviation fuel) and MGO (marine gas oil) for shipboard applications and JP-8 for land applications.**
  - **Being deployed from the continental U.S. without substantial modification.**
- **Tactical equipment generally operates fewer hours annually than similar commercial equipment.**
- **In many instances tactical equipment is essential for national security (protection of life and property).**

Introduction of IMO/EPA Compliant Engines

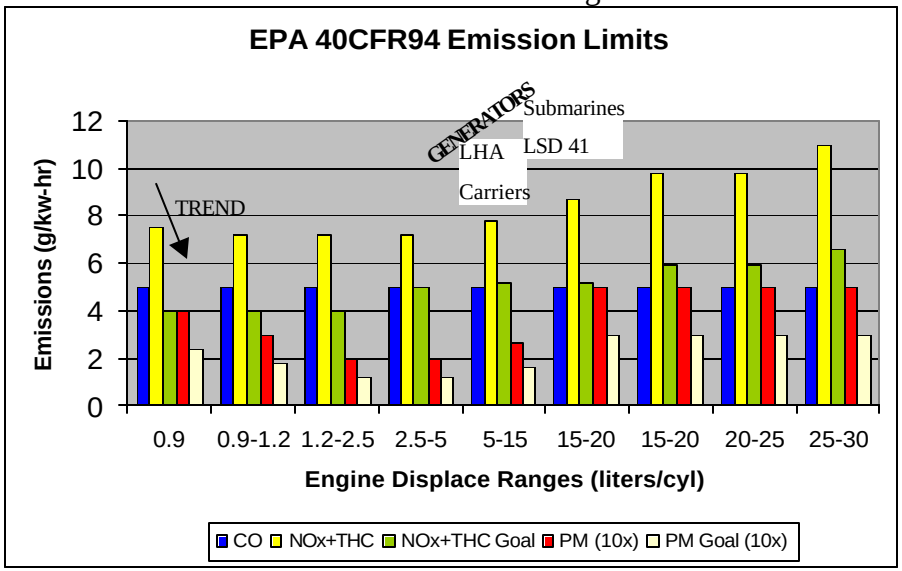
- **New construction**
  - **LPD-17: Caterpillar & Pielstick; 12 ships**
  - **LHD-8: Pielstick; 1 (+4 possible) ships**
  - **T-AKE: Fairbanks Morse or Pielstick; 12 ships**
  - **T-AKR: Pielstick/Wartsila and Caterpillar); 12 ships**
  - **JMLS: (engine not yet selected); 222 units**
  - **LCU: (engine not yet selected); 70 units**
- **Re-power**
  - **FFG-7: Caterpillar; 60 - 92 units**
  - **CAC: Caterpillar; 6 craft**
  - **MCM/MHC: (engine not yet selected); 153 units**

Emission Trends
(courtesy of SouthWest Research Institute and ICAO)

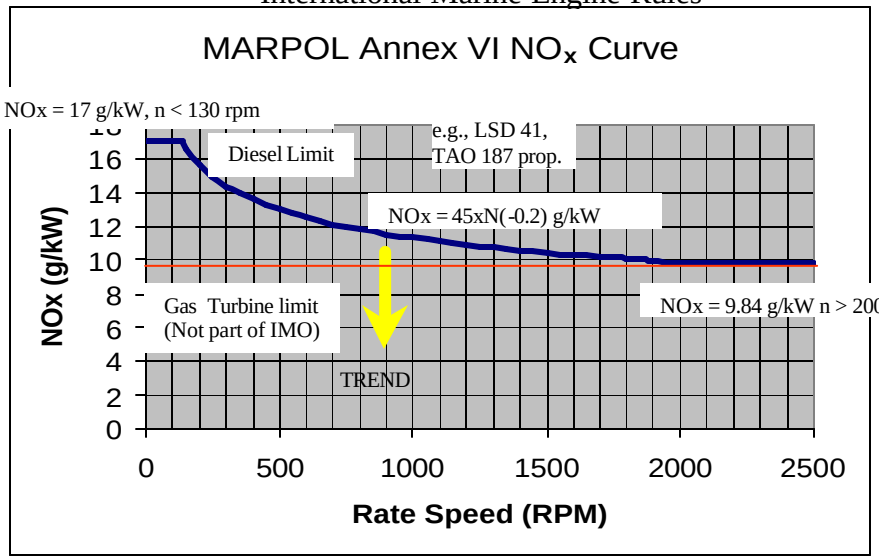
Air (**AF, NAVIR Program Goals**)



US Marine Engine Rules



International Marine Engine Rules



Mobile Land (**DOE Program Goals**)